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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/898,909	07/03/2001	Detlef Weber	12816-021001/S1166	9573
26161	7590	12/03/2003	SB/flu	
FISH & RICHARDSON PC				
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BOSTON, MA 02110				
			EXAMINER	
			CAO, PHAT X	
			ART UNIT	PAPER NUMBER
			2814	

DATE MAILED: 12/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/898,909	Applicant(s) WEBER, DETLEF	
	Examiner Phat X. Cao	Art Unit 2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 14-27 is/are pending in the application.
- 4a) Of the above claim(s) 14-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 21-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. the Request for Continued Examination filed 10/30/03 is acknowledged.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 21-23 and 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jeng et al (US. 5,744,865) in view of Sethi et al (US. 5,573,973).

Jeng (Fig. 1-7) discloses a method for fabricating a metallization arrangement for a semiconductor structure, the method comprising: providing a first metallization plane 28 on the semiconductor structure 12 having an electrical circuit 14 (Fig. 5); providing a first intermediate dielectric 30 on the metallization plane 28 (Fig. 6), the first intermediate dielectric 30 made of silicon dioxide and having a first dielectric constant; providing a liner layer 16 made of diamond dielectric material on the first intermediate dielectric 30 (Fig. 7) and having a second dielectric constant; providing via holes 18 in the first intermediate dielectric 30 and the liner layer 16 (Fig. 7), the via holes 18 being filled with a conductive material, thereby completing a first resulting structure; providing a second metallization plane on the first resulting structure, the liner layer 16 acting as a diffusion barrier for the second metallization plane; patterning a first interconnect and a second interconnect 22 in the second metallization plane by using a mask; completely interrupting the liner layer 16 between the first and second interconnects 22 by common

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etching step (column 4, lines 22-28), thereby forming an interspace between the first and second interconnects 22 for preventing capacitive coupling between the first and second interconnects (column 4, lines 22-40); and a dielectric 26 in the interspace.

Jeng does not specifically disclose that the liner 16 made of diamond has the dielectric constant greater than the first intermediate dielectric 30 made of silicon dioxide.

However, Sethi teaches that as recognized by one skilled in the art, the diamond would have much higher dielectric constant than silicon dioxide (column 3, lines 54-61). Therefore, the liner 60 made of diamond would have the dielectric constant greater than the first intermediate dielectric 30 made of silicon dioxide.

4. Claims 21-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art in view of Jeng et al (US. 5,744,865).

Applicant's admitted prior art (Fig. 2 and pages 1-2 of specification) teaches a method for fabricating a metallization arrangement for a semiconductor structure, the method comprising: providing a first metallization plane M1 on the semiconductor structure; providing a first intermediate dielectric ILD of low dielectric constant on the first metallization plane M1; providing a liner layer L2 made of silicon nitride on the first intermediate dielectric and having a high dielectric constant which is greater than the low dielectric constant of the first intermediate dielectric ILD (page 2 of specification, lines 5-19); providing via holes V in the first intermediate dielectric ILD and the liner layer L2, the via holes being filled with a conductive material FM, thereby completing a first resulting structure; providing a second metallization plane M2 on the first resulting

structure, the liner layer L2 of silicon nitride acting as a diffusion barrier for the second metallization plane M2; and patterning first and second interconnects LBA and LBB in the second metallization plane M2 by using a mask thereby forming an interspace between the first and second interconnects.

Applicant's admitted prior art (Fig. 2) does not disclose that the liner L2 in the inter-space between the first and second interconnects LBA/LBB is removed.

However, Jeng (Fig. 7 and column 4, lines 22-31) teaches the forming of a second metallization plane by patterning the first and second interconnects 22 and by completely interrupting the liner layer 16 in the inter-space between the first and second interconnects 22. Accordingly, it would have been obvious to include the step of interrupting the admitted prior art liner layer in the inter-space between the first and second interconnects because as taught by Jeng, such step would prevent capacitive coupling between the first and second interconnects (column 4, lines 28-40).

Response to Arguments

5. Applicant's arguments with respect to the claimed invention have been considered but are moot in view of the new ground(s) of rejection.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phat X. Cao whose telephone number is (703) 308-4917. The examiner can normally be reached on Monday - Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (703) 308-4918. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-7722.


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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

PC
November 26, 2003


PHAT X. CAC
PRIMARY EXAMINER